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反应堆工程

船用核动力二回路热力系统动态仿真

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摘要 基于船用核动力装置运行安全分析，建立了二回路系统两相流通用仿真软件模型，实现了人工干预条件下复杂两相流流体网络系统的动态特性实时仿真，拓展了目前核动力装置通用安全分析程序的研究范围。以二回路快速降负荷为例，对仿真模型的性能进行了验证。结果表明：该软件模型能准确反映船用二回路系统的动态特性，可用于事故处置规程和控制系统功能的验证。该模型也可用于核电站饱和蒸汽系统仿真软件的开发。

关键词 船用核动力 饱和蒸汽 仿真模型 运行安全分析

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Simulation on Secondary Loop of Marine Nuclear Power

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Abstract Based on operational safety analysis of marine nuclear power, a general two-phase flow simulation model for nuclear secondary loop system was established, which can fit the needs of real-time dynamic simulation of complex two-phase fluid networks under manual intervention conditions, and expand the reach field of current general safety analysis program of nuclear power plant. As an example, the capability of the simulation model was validated by taking simulation of rapidly power reducing condition of secondary loop. The results indicate that the model reflects the dynamic characteristics of secondary loop system of marine nuclear power properly, and can be used to validate the accident treatment regulation and function of control system. The model can also fit the needs of developing saturated steam system simulation software of nuclear power station.

Key words marine nuclear power _ saturated steam _ simulation model _ operational safety analysis

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